

film; and

removing a structure above said first polysilicon film from the region where the thickest gate insulating film is to be formed, among said plurality of regions.--

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[Amend claim 8 as follows:]

--8. (amended) A method according to claim 7, wherein said step of injecting fluorine comprises the step of:

setting conditions for injecting fluorine such that the gate insulating films formed on said semiconductor substrate have a thickness difference of at least 0.2 nm.--

REMARKS

The title and drawings have been amended to make editorial changes therein, bearing in mind the criticisms in the Official Action, to place the application in condition for allowance at the time of the next Official Action.

The Official Action objects to claims 2, 5, and 8. These claims have been amended and reconsideration and withdrawal of the objection are respectfully requested. Support for the amendment is found in Figure 8.

Claims 1 and 2 were rejected as anticipated by the admitted prior art (APA). Claim 1 has been amended to provide that an exposed surface of the oxide film is nitrided. Reconsideration and withdrawal of the rejection are respectfully requested.

The APA discloses two separate methods for making gate insulating films with different thicknesses. The first method, shown in Figures 1a-e, includes forming oxide layers with different thicknesses followed by diffusing nitrogen from an NO gas under pressure into the oxide layers to form an oxynitride film between the oxide layers and the substrate. The second method, shown in Figures 2a-c, includes forming an oxynitride film 114 and then forming the oxide layers between the oxynitride film and the substrate. There is no suggestion that the two methods are compatible or that steps from the two methods can be mingled. The law is clear that the elements must be arranged as required by the claim for an anticipation rejection to be sustained. The APA does not meet this test.

Neither APA method includes a step of nitriding an exposed surface of the oxide film to turn an exposed surface layer of the oxide film into an oxynitride film or to form a nitride film on the exposed surface of the oxide film. The first method forms the oxynitride film between the oxide layer and the substrate, not on an exposed surface of the oxide film. The second method forms the oxynitride film first, on the substrate and not on an exposed surface of the oxide film (indeed, no portion of the oxide film is exposed in this method).

Accordingly, the amended claims avoid the rejection under §102.

Claims 3-9 were rejected as unpatentable over the APA in view of further references. Independent claims 4 and 7 have been amended in a manner that corresponds to the amendment of claim 1. Reconsideration and withdrawal of the rejections are respectfully requested for the reasons set forth above. The further references are directed to other features of the invention that were not included in claim 1 and the further references do not make up for the shortcomings noted above. None of the references discloses a step of nitriding an exposed surface of the oxide film to turn an exposed surface layer of the oxide film into an oxynitride film or to form a nitride film on the exposed surface of the oxide film.

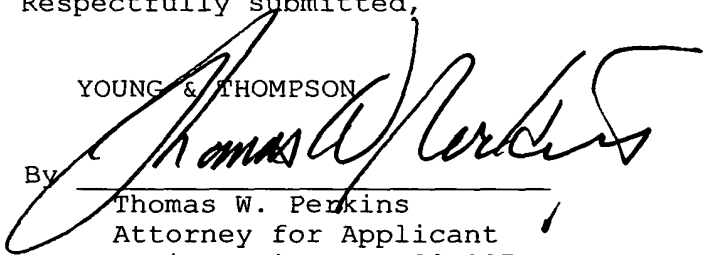
In view of the present amendment and the foregoing remarks, it is believed that the present application has been placed in condition for allowance. Reconsideration and allowance are respectfully requested.

Attached hereto is a marked-up version of the changes made to the title and claims. The attached page is captioned "VERSION WITH MARKINGS TO SHOW CHANGES MADE."

Respectfully submitted,

YOUNG & THOMPSON

By


Thomas W. Perkins
Attorney for Applicant
Registration No. 33,027
745 South 23rd Street
Arlington, VA 22202
Telephone: 521-2297

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE TITLE:

The title throughout, declaration excepted, has been amended as follows:

--METHOD OF MANUFACTURING A SEMICONDUCTOR DEVICE HAVING A PLURALITY OF GATE INSULATING FILMS OF DIFFERENT THICKNESSES[, AND METHOD OF MANUFACTURING SUCH SEMICONDUCTOR DEVICE--.

IN THE CLAIMS:

Claim 1 has been amended as follows:

--1. (amended) A method of manufacturing a semiconductor device having a plurality of gate insulating films of different thicknesses on a semiconductor substrate, comprising the steps of:

injecting fluorine into a region of a semiconductor substrate other than a region of the semiconductor substrate where a thinnest gate insulting film is to be formed, among a plurality of regions where gate insulating films are to be formed;

oxidizing the semiconductor substrate with fluorine injected therein to form an oxide film in said plurality of regions; and

nitriding [a] an exposed surface of said oxide film to turn [a] an exposed surface layer thereof into an oxynitride film or to form a nitride film on the exposed surface of said oxide film.--

Claim 2 has been amended as follows:

--2. (amended) A method according to claim 1, wherein said step of injecting fluorine comprises the step of:

setting conditions for injecting fluorine such that the gate insulating films formed on said semiconductor substrate have a thickness difference of at least 0.2 nm.--

Claim 4 has been amended as follows:

--4. (amended) A method of manufacturing a semiconductor device having a plurality of gate insulating films of different thicknesses on a semiconductor substrate, comprising the steps of:

forming a first oxide film on a surface of a semiconductor substrate;

removing said first oxide film from regions of the semiconductor substrate other than a region of the semiconductor substrate where a thickest gate insulating film is to be formed, among a plurality of regions where gate insulating films are to be formed;

injecting fluorine into the region other than the region where a thinnest gate insulating film is to be formed, among the regions of the semiconductor substrate from which said first oxide film has been removed;

oxidizing the semiconductor substrate with fluorine injected therein to form a second oxide film in said plurality of regions; and

nitriding [a] an exposed surface of said second oxide film to turn [a] an exposed surface layer thereof into an oxynitride film or to form a nitride film on the exposed surface of said second oxide film.--

Claim 5 has been amended as follows:

--5. (amended) A method according to claim 4, wherein said step of injecting fluorine comprises the step of:

setting conditions for injecting fluorine such that the gate insulating films formed on said semiconductor substrate have a thickness difference of at least 0.2 nm.--

Claim 7 has been amended as follows:

--7. (amended) A method of manufacturing a semiconductor device having a plurality of gate insulating films of different thicknesses on a semiconductor substrate, comprising the steps of:

forming a first oxide film on a surface of a semiconductor substrate;

forming a first polysilicon film on a surface of said first oxide film;

removing said first polysilicon film and said first oxide film from regions of the semiconductor substrate other than a region of the semiconductor substrate where a thickest gate insulating film is to be formed, among a plurality of regions where gate insulating films are to be formed;

injecting fluorine into the region other than the region where a thinnest gate insulating film is to be formed, among the regions of the semiconductor substrate from which said first polysilicon film and said first oxide film have been removed;

oxidizing the semiconductor substrate with fluorine injected therein to form a second oxide film in said plurality of regions;

nitriding [a] an exposed surface of said second oxide film to turn [a] an exposed surface layer thereof into an oxynitride film or to form a nitride film on the exposed surface of said second oxide film;

forming a second polysilicon film on [a] an exposed surface of said oxynitride film or [a] an exposed surface of said nitride film; and

removing a structure above said first polysilicon film from the region where the thickest gate insulating film is to be formed, among said plurality of regions.--

Claim 8 has been amended as follows:

--8. (amended) A method according to claim 7, wherein said step of injecting fluorine comprises the step of:

setting conditions for injecting fluorine such that the gate insulating films formed on said semiconductor substrate have a thickness difference of at least 0.2 nm.--